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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/047,455	01/15/2002	Edwin L. Piner	N00400/70013 RJP/RHW	1054
23628 7590 03/28/2007 WOLF GREENFIELD & SACKS, P.C. 600 ATLANTIC AVENUE BOSTON, MA 02210-2206			EXAMINER HU, SHOUXIANG	
			ART UNIT	PAPER NUMBER
			2811	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

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Office Action Summary

Application No.

10/047,455

Applicant(s)

PINER ET AL.

Examiner

Shouxiang Hu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 12-16, 19-22, 30, 39-43 and 45-47 is/are pending in the application.
- 4a) Of the above claim(s) 1, 12-16, 19-22, 39-42 and 45-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30 and 43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

According to the previous office action and the latest amendment, claims 1, 12-16, 19-22, 30, 39-43 and 45-47 are pending in this application; and claims 30 and 43 remain active in this office action.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 30 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito (WO98/44569; also see US 6,583,442 for its English translation) in view of Bulsara (US 6,589,335).

Ito discloses a semiconductor structure (see US 6,583,442; Fig. 1, col. 3, lines 45-52, and col. 4, lines 1-10), comprising: a silicon germanium (SiGe) layer (at least the top portion layer of the substrate layer similar to layer 101 in Fig. 1); a gallium nitride material layer (similar to layer 102, 103, and/or 104); and, an intermediate layer (at least the layer 102; GaN, or a bottom portion of it).

Ito further discloses that the substrate can also be formed of silicon.

Although Ito does not expressly disclose that the SiGe layer can be formed on a silicon substrate, one of ordinary skill in the art would readily recognize that a silicon substrate can be desirably and commonly used to form a SiGe layer thereon for improving the cost and/or quality of a substrate including the SiGe layer, as evidenced in Bulsara (see the SiGe layer 104 on the silicon substrate 102 in Fig. 1A).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the structure of Ito with the SiGe layer being formed on a silicon substrate, per the teaching of Bulsara, so that a structure with improvement in quality and/or cost for the substrate including the required SiGe layer would be obtained.

Response to Arguments

Applicant's arguments filed on January 16, 2007 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). And, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

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references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Ito discloses the claimed invention, except that the recited SiGe layer can be formed on a silicon substrate. Bulsara is cited to show that one of ordinary skill in the art would readily recognize that such a SiGe layer can be desirably formed on a silicon substrate for improving the cost and/or quality of a substrate including the required SiGe layer. Therefore, it would be well within the ordinary skill in the art to make the structure of Ito with the SiGe layer being formed on a Si substrate, per the teachings of Bulsara, so as to make a structure with improved quality and/or cost for the substrate including the required SiGe layer.

Furthermore, Ito does not constitute any teaching away from the claimed invention, because it has been held that:

Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

And, it is also because:

(A) Ito further expressly discloses that the substrate can also be formed of silicon.

(B) One of ordinary skill in the art would readily recognize that the LED structure shown in Fig. 1 of Ito can naturally and readily emit light through the top transparent electrode, regardless what material the substrate is made of.

(C) At least the SiGe layer as that specifically required in the desired embodiment of Fig. 1 in Ito can still be remained inside the above collectively taught device structure. And/or,

(D) The light emitting layer in Ito can be formed of InGaN and/or AlInN (see col. 4, lines 1-10). And, one of ordinary skill in the art would readily recognize that, as readily evidenced in the prior art such as Koike (US 6,620,643; see the abstract), such layer(s) can be readily formed/adapted to emit visible light(s), for which the silicon substrate including the SiGe layer would be naturally substantially transparent.

Responses to applicant's other arguments have been incorporated into the Detailed Office action above.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Reference A is cited as being related to a GaN-based light-emitting structure.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shouxiang Hu whose telephone number is 571-272-1654. The examiner can normally be reached on Monday through Friday, 8:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard T. Elms can be reached on 571-272-1869. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SH
March 22, 2007



SHOUXIANG HU
PRIMARY EXAMINER